

**Statistical analysis data on the effectiveness of acupuncture treatment for  
trigeminal neuralgia**

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**Abstract**

The trigeminal nerve (cranial nerve V) is the largest of the cranial nerves and plays a key role in sensing stimuli from the face and head. It has three main branches: the ophthalmic (V1), maxillary (V2), and mandibular (V3) divisions. The cell bodies of these sensory fibers are located in the trigeminal ganglion, and they relay information to second-order neurons within the sensory nuclei of the trigeminal complex in the brainstem. Trigeminal neuralgia is a chronic pain disorder causing sudden, severe, electric shock-like facial pain due to irritation or damage to the trigeminal nerve, which supplies sensation to the face. The second branch (V2, maxillary nerve) is most commonly affected (35%), followed by the third branch (V3, mandibular nerve; 30%), with the right side being somewhat more frequently affected (about 60%, the reason for this laterality remains unknown). Acupuncture shows promise for trigeminal neuralgia (TN) by reducing pain intensity and frequency, improving quality of life, and potentially offering a safer alternative to medications, working through endorphin release and improved circulation, though more high-quality. This research paper concerns 40 patients with trigeminal neuralgia, of whom 14 were men and 26 were women. The most prevalent age group was between 50-70 years old. Statistical data from this clinical paper show that acupuncture treatment has excellent results for treating trigeminal neuralgia.

**Keywords:** Acupuncture, Traditional Chinese Medicine, trigeminal neuralgia, statistic analyses

## Introduction

Trigeminal neuralgia (TN) is a long-term facial pain disorder caused by 1 or more trigeminal nerve branch lesions, mostly unilateral. TN is typically characterized by transient, intense electroshock pain, seizures and terminations that range from a few seconds to a few minutes at a time. [1] TN can be divided in two types: typical trigeminal neuralgia and atypical trigeminal neuralgia. [2] The typical trigeminal neuralgia causes extreme, occasional, sudden burning or electric-like facial pain that can last from a few seconds to up to 2 minutes. The induction of these pains can be continuous, and some can even be induced continuously for several hours. The atypical trigeminal neuralgia is usually manifested as persistent low-intensity pain. Two types of trigeminal neuralgia can occur in combination. Although TN is not a pathogenic disease, its severe pain symptoms still severely reduce the patient's quality of life. [3]

More recently, it has been understood that up to 30% of patients may present with continuous pain of moderate intensity within the same distribution as the affected nerve division. Various classification methods have been proposed for facial pain. [4] The International Headache Society has divided TN into 3 main categories: classic, secondary/symptomatic, and idiopathic. Classic TN is typically linked to neurovascular compression of the trigeminal nerve root, often accompanied by structural changes that can be detected on MRI. [4] Secondary/symptomatic trigeminal (STN) neuralgia is associated with an underlying disease. The most common causes include multiple sclerosis (MS), space-occupying lesions, skull-base bone deformity, connective tissue diseases, arteriovenous malformations, dural arteriovenous fistulae, or genetic causes of neuropathy. Idiopathic trigeminal neuralgia (ITN) is diagnosed by exclusion, meaning it is considered only when neither classic nor secondary forms are identified after appropriate evaluations, such as MRI and electrophysiological testing. Both classic TN and ITN can further be classified based on the presence of concomitant pain. [4]

The diagnosis of TN is primarily based on clinical criteria. According to the International Headache Society classification system, pain caused by a lesion or disorder of the trigeminal nerve is categorized into two groups: trigeminal neuralgia and painful trigeminal neuropathy, as outlined in the International Classification of Headache Disorders, Third edition. TN is further subclassified into classical, secondary, or idiopathic, according to etiology. Brain MRI is recommended in patients with clinical diagnosis of TN, in order to rule out secondary causes. For MRI evaluation of neurovascular compression, high-resolution sequences such as FIESTA, DRIVE, or CISS are recommended, as they provide clear visualization of the trigeminal nerve and surrounding vessels. Pharmacological treatment is the initial choice in all patients. In selected cases with drug-resistant pain or poor tolerance, surgery should be considered. [5]

A proper and thorough patient history is of the utmost importance when diagnosing TN, as it is a partially exclusionary diagnosis that is based on specific clinical features, whereas subsequent testing may be used to further elucidate the specific cause. The third edition of the International Classification of Headache Disorders (ICHD-3) by the International Headache Society, published in 2018, defined the features necessary for the diagnosis of TN. [6]

### Diagnostic Criteria

A. Recurrent unilateral facial pain in one or more distributions of the trigeminal nerve with no radiation beyond and fulfilling criteria B and C

B. Pain has the following characteristics:

- 1. Lasts from a fraction of a second to 2 minutes
- 2. Severe intensity
- 3. Electric shock like, shooting, stabbing, or sharp in quality

C. Precipitated by innocuous stimuli within the affected trigeminal distribution

D. Is not accounted for by another ICHD-3 diagnosis [6]

Epidemiologically, TN represents a complex interaction of present risk factors varying from environmental triggers and genetic predisposition. [7,8]. Advanced analytical methods such as Mendelian randomization have identified certain modifiable risk factors, including years of schooling, sleep duration, anxiety disorders, depression, autoimmune diseases, and body mass index, for the incidence of TN [9].Recent epidemiological studies of general practice research databases reported a TN incidence ranging from 12.6 to 26.8 per 100.000/year, with the incidence increasing with age (16.3 in the fourth decade, 30.6 in patients older than 80 years). [10] [11].

The treatment of TN is a hotspot of current research, mainly by surgical treatment and medical treatment.[12] Carbamazepine is the only drug with class I evidence (grade of recommendation A); therefore, this continues to be the treatment of choice and the only approved treatment for this indication. Though with a relatively low degree of certainty, 2 main lines of treatment have been established (Table 1). [13][14].

**Table 1.** Pharmacological treatment of trigeminal neuralgia, with levels of evidence

|                                 |
|---------------------------------|
| Treatment line Drugs            |
|                                 |
| First line Carbamazepine (I, A) |
| Oxcarbazepine (IV, C)           |
| Eslicarbazepine acetate (IV, C) |
| Second line Lamotrigine (II, B) |
| Baclofen (II, B)                |
| Gabapentin (IV, C)              |
| Pregabalin (IV, C)              |
| Others Phenytoin (IV, C)        |
| Lidocaine (IV, C)               |
| Miscellaneous (IV, C)           |
| Pimozide                        |
| Tocainide                       |
| Clonazepam                      |
| Topiramate                      |
| Valproic acid                   |
| Levetiracetam                   |
| Lacosamide                      |

Surgery, as an effective treatment, has many limitations on patients’ physical fitness, many complications, the long-term efficacy is not ideal, and the treatment cost is high, as shown in the survey: [15] in the last ten years, the management cost of TN in the United States has been more than \$9,400,000. The long-term use of drugs may cause adverse reactions and develop drug resistance, and the recurrence rate of medical treatment of TN is 18.5%.[16] [17].

Acupuncture can regulate the expression of ion channel pain receptors, among which transient receptor potential vanillic acid 1 (TRPV1) is involved in the formation,

transmission, and regulation of pain sensation in chronic neuropathic pain. [17] [18]. Acupuncture can alleviate pain by regulating inflammatory factors.[19] Studies have confirmed that acupuncture treatment can improve the visual analog score (VAS) of TN patients, reduce the levels of inflammatory factors such as TNF- $\alpha$  and IL-6, reduce the inflammatory response, and improve the life satisfaction index of TN patients.[20] As a treatment for trigeminal neuralgia, the acupuncture can give very positive and satisfying results, thereby reducing the pain in the face, ears, head, jaw and eyes, loosening the muscles, facilitating the movements in the joints, the speaking and chewing the food [21].

**Methods**

This scientific paper explains the efficacy of acupuncture treatment for trigeminal neuralgia, in which 40 patients with diagnosed trigeminal neuralgia were treated in 2 year period. The patients were statistically analyzed by gender, age, pain localization, drug therapy, VAS - Visual Analog Scale, number of acupuncture treatments, hot needle treatment, occurrence of remission and treatment efficacy. The patients were divided into 3 groups: patients with TN who were treated with acupuncture, patients with TN who were treated with fire needles, and patients who were treated with both therapies combined (acupuncture and fire needles). Treatments are done by a doctor specialist in acupuncture with duration of 5-30 minutes, depending on which therapy is used. Treatments are done on Ashi i.e. trigger points on the most affected areas on the face. Ashi points are individual for every patient. Most usually treated points are: BL2 (Cuanzhu), LI20 (Yiangxiang) and ST8 (Touwei). [21].

**Results**

**Table 2.** *Division of treated patients by gender and age*

| Gender          | <30 years old | 30-50 years old | 50-70 years old | >70 years old | Total |
|-----------------|---------------|-----------------|-----------------|---------------|-------|
| Male patients   | /             | 4               | 7               | 3             | 14    |
| Female patients | /             | 9               | 13              | 4             | 26    |
| Total           |               |                 |                 |               | 40    |

Diagram 1. Face diagram with pain zones for V1, V2, V3

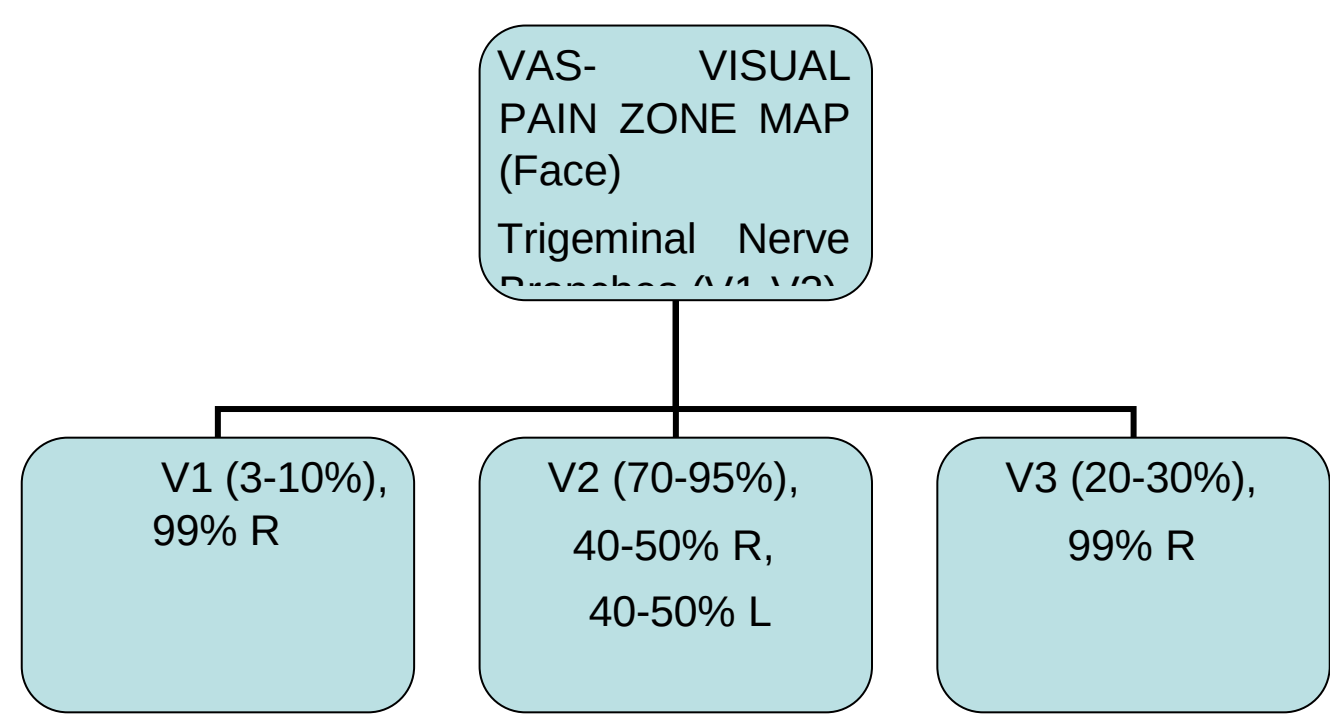


Table 3. Representation of different types of neuralgia by percentage

|             |      |
|-------------|------|
| Typical TN  | 96%  |
| Atypical TN | 4%   |
| Total       | 100% |

Table 4. Correlation between clinical characteristics and gender of the patients

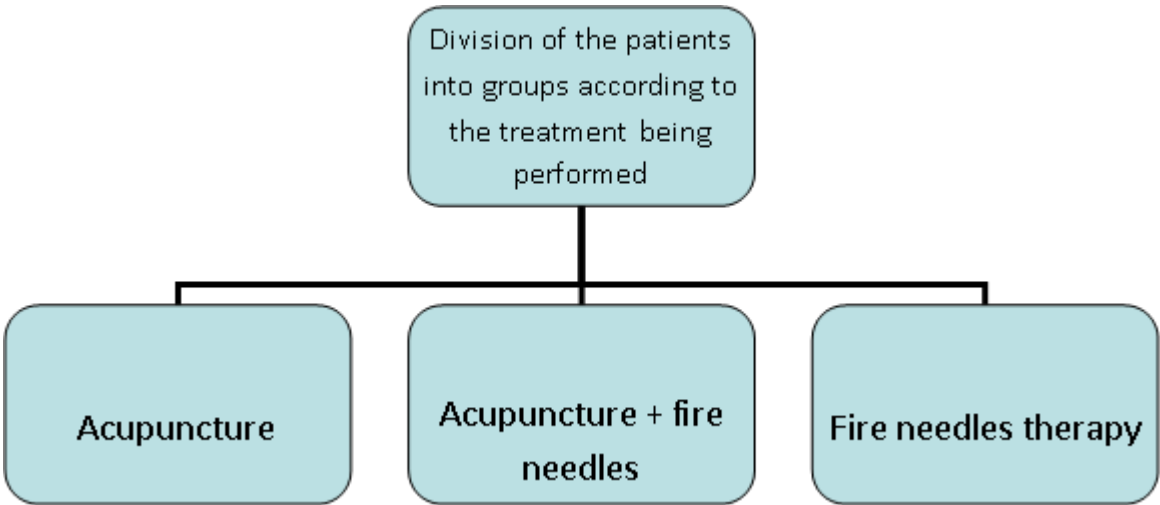
| Clinical characteristics       | Gender (n) %<br>Female (n=27) | Gender (n)%<br>Male (n=13) | Total | p-value |
|--------------------------------|-------------------------------|----------------------------|-------|---------|
| The side of the face involves  |                               |                            |       |         |
| Left                           | 2 (7.5%)                      | 0                          | 2     |         |
| Right                          | 25 (92,5 %)                   | 13 (100%)                  | 38    |         |
| Total                          | 100                           | 100                        | 40    |         |
| Division of the nerve involved |                               |                            |       |         |
| V1                             | 0                             | 1 (7.6%)                   | 1     |         |
| V2                             | 24 (88.8%)                    | 11 (84.5%)                 | 35    |         |
| V3                             | 3 (11.1%)                     | 1 (7.6%)                   | 4     |         |
| Total                          | 100                           | 100                        | 40    |         |

|                                                       |           |            |    |  |
|-------------------------------------------------------|-----------|------------|----|--|
| Characteristics of pain (McGill's Pain Questionnaire) |           |            |    |  |
| Burning/lancinating                                   | 1 (3.7%)  | 2 (15.5%)  | 3  |  |
| Shock-like                                            | 25 (92,6) | 10 (76.9%) | 35 |  |
| Throbbing                                             | 1 (3.7%)  | 1 (7.6%)   | 2  |  |
| Total                                                 | 100       | 100        | 40 |  |
| Onset of pain                                         |           |            |    |  |
| Acute, spontaneous                                    | 2 (7.4%)  | 1 (7.7%)   | 3  |  |
| Correlated with dental treatment                      | 25 (92,6) | 12 (92.3%) | 37 |  |
| Total                                                 | 100       | 100        | 40 |  |

**Table 5.** Correlation between clinical characteristics and age of the patients

| Clinical characteristics                              | Age (n)<br>30-50 | Age (n)<br>51-70 | Age7 (n)<br>71> | Total | p-value |
|-------------------------------------------------------|------------------|------------------|-----------------|-------|---------|
| The side of the face involves                         |                  |                  |                 |       |         |
| Left                                                  | 0                | 1                | 0               | 1     |         |
| Right                                                 | 13 (33.3%)       | 19 (48.7%)       | 7 (17.9%)       | 39    |         |
| Division of the nerve involved                        |                  |                  |                 |       |         |
| V1                                                    | 0                | 1 (2.5%)         | 0               | 1     |         |
| V2                                                    | 10 (25.6%)       | 19 (48.7%)       | 6 (15.3%)       | 35    |         |
| V3                                                    | 1 (2.5%)         | 2 (5.1%)         | 1 (2.5%)        | 4     |         |
| Characteristics of pain (McGill's Pain Questionnaire) |                  |                  |                 |       |         |
| Burning/lancinating                                   | 0                | 1 (2.5%)         | 0               | 0     |         |
| Shock-like                                            | 8 (20.5%)        | 24 (61.5%)       | 7 (17.9%)       | 39    |         |
| Throbbing                                             | 0                | 1 (2.5%)         | 0               | 1     |         |
| Onset of pain                                         |                  |                  |                 |       |         |
| Acute, spontaneous                                    | 0                | 1 (2.5%)         | 0               | 1     |         |
| Correlated with dental treatment                      | 13 (33.3)        | 20 (51.2)        | 6 (15.3)        | 39    |         |

**Diagram 2.** Division of the patients into groups according to the treatment being performed



**Table.6** Number of different types of therapy

| Different types of therapy | Acupuncture Therapy | Fire needle Therapy | Acupuncture and fire needle Therapy | Total |
|----------------------------|---------------------|---------------------|-------------------------------------|-------|
| No. of male patients       | 6                   | 5                   | 3                                   | 14    |
| No of female patients      | 12                  | 12                  | 2                                   | 26    |
|                            |                     |                     | Total                               | 40    |

**Table 7.** Number of different treatments for patients

|                                     | No of treatments for patients <5 | No of treatments for patients 5-10 | No of treatments for patients >10 |
|-------------------------------------|----------------------------------|------------------------------------|-----------------------------------|
| Acupuncture therapy                 | 3                                | 6                                  | 5                                 |
| Fire needle therapy                 | 2                                | 3                                  | 2                                 |
| Acupuncture and fire needle therapy | 1                                | 1                                  | 3                                 |

**Table 8.** Number of patients who received drug therapy before and after acupuncture, fire needle treatment and combination acupuncture and fire needle treatments

| No. of patients who use medicine before and after therapy                          | Carbamazepine | Corticosteroids | NSAID |
|------------------------------------------------------------------------------------|---------------|-----------------|-------|
| Before acupuncture therapy/ after acupuncture therapy                              | 18/1          | 5/0             | 3/0   |
| Before fire needle therapy/ after fire needle therapy                              | 18/0          | 3/0             | 0/0   |
| Before acupuncture + fire needle therapy / after acupuncture + fire needle therapy | 5/0           | 1/0             | 0/0   |

**Table 9.** Number of patients with remission

|                                     | Number of patients with remission after 1 month | Number of patients with remission after 1-6 month | Number of patients with remission after 6 months |
|-------------------------------------|-------------------------------------------------|---------------------------------------------------|--------------------------------------------------|
| Acupuncture therapy                 | 0                                               | 0                                                 | 1                                                |
| Fire needle therapy                 | 0                                               | 0                                                 | 0                                                |
| Acupuncture and fire needle therapy | 1                                               | 0                                                 | 0                                                |

**Discussion**

Of the 40 treated patients diagnosed with trigeminal neuralgia, 14 were men and 26 were women. The most prevalent age group was between 50-70 years old, as shown in Table 2. The pain that occurs in the 3 branches of the face is represented according to the following percentages: V1=3-10%, V2=70-95%, V3=20-30%. Diagram 1 shows that in the V1 branch, as much as 99% of the pain is concentrated on the right side, in the V2 branch, the pain occurs on both the left and right sides 40-50%, in the V3 branch, the pain occurs 99% on the right side. The distribution of neuralgia in treated patients is shown in table number 3, where it is indicated that up to 96% of neuralgia is typical neuralgia. Table 4 shows the correlation between clinical characteristics by gender and the relationship of the cause with the occurrence of the diagnosis. As many as 38 patients had trigeminal neuralgia on the right side, mostly on the V2 branch, more in female patients 92.5%. According to McGill’s Pain Questionnaire, the characteristics of pain, most patients 35 in number reported that they had severe pain like a shock line, more in female patients 92.6% . Even in 92.5% of patients, the pain occurred after

dental treatment, more in female patients 92.6%. Table 5 shows the correlation between clinical characteristics and age of the patients. Patients with right-sided trigeminal neuralgia aged 51 to 70 years are represented by 48.7%, which is the highest percentage, and the same age group also represents the prevalence of V2 branch neuralgia, in which as many as 51.2% occur after dental procedures. Patients with trigeminal neuralgia were treated with 3 different treatments depending on their condition: acupuncture treatment, fire needle treatment, or a combination (diagram 2). The number of patients who received different types of treatment is shown in table 6. The table indicates that more patients were treated with individual therapies (acupuncture or fire needles) than with a combination. Table 8 shows the number of patients who received drug therapy before and after acupuncture, fire needle treatment and combination acupuncture and fire needle treatments. Patients who had acupuncture treatment and took medication with Carbamazepine, out of 18 patients who took Carbamazepine after acupuncture treatment, only 1 patient continued to take Carbamazepine therapy. Out of 18 patients who were treated with fire needles and took Carbamazepine, no patient took Carbamazepine therapy after fire needle therapy. Out of 5 patients who took Carbamazepine and had combined acupuncture and fire needle therapy, no patient continued to take medication with Carbamazepine. Patients who took corticosteroids and NSAIDs before treatment, after acupuncture treatment, fire needle treatment or combination did not take corticosteroid and NSAID medication therapy at all. Remission occurred in only 2 patients, one patient 1 month after completing the combined acupuncture and hot needle therapy, and one patient experienced remission 6 months after the last acupuncture treatment. (table 9).

## Conclusion

According to a clinical study of 40 patients, it has been proven that trigeminal neuralgia occurs more often in women aged 51-70. It most often occurs on the right branch of the V2 nerve with an intense shock line of pain that occurs in short intervals (typical neuralgia). In the largest percentage of patients, the pain occurs after dental treatment. All treatments from Traditional Chinese Medicine that have been performed on patients with trigeminal neuralgia have excellent results after the treatments. The patients do not have symptoms of intense short-term shocking pain and do not take drug therapy with Carbamazepine, corticosteroids or NSAIDs after performing the TCM treatments. Only 2 patients experienced short-term remission within 1 and 6 months of the acupuncture treatment.

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